

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Original) A method for managing Internet Protocol (IP) addresses on a data communications network, comprising:  
  
allocating a plurality of local IP address pools, each of said local IP address pools associated with a different network edge device capable of accepting connection requests requiring an IP address, said network edge device having a local memory, said local memory including a local IP address pool database;  
  
requesting IP address usage data from one or more of said network edge devices;  
  
receiving said requested IP address usage data;  
  
determining whether one or more of said plurality of local IP address pools should be reallocated based upon at least said requested IP address usage data;  
  
reallocating one or more of said plurality of local IP address pools based upon said determining; and  
  
updating one or more of said local IP address pool databases and a global IP pool database based upon said reallocating, said global IP address pool database including the information maintained in each said local IP address pool.

2. (Original) The method of claim 1 wherein  
said local IP address pool includes a high watermark that indicates the maximum  
number of IP addresses used by said network edge device;  
said determining further comprises ascertaining whether said high watermark of a  
local address pool exceeds a high watermark limit; and  
said method further comprises indicating one or more IP address pools should be  
reallocated to give more IP addresses to the network element associated  
with said high watermark when said high watermark exceeds said high  
watermark limit.
3. (Original) The method of claim 2 wherein  
each said local IP address pool further comprises a low watermark that indicates  
the minimum number of IP addresses used by said network edge device;  
said determining further comprises ascertaining whether said low watermark of  
said address pool exceeds a low watermark limit; and  
said method further comprises indicating one or more IP address pools should be  
reallocated to reclaim IP addresses from the network element associated  
with said low watermark when said low watermark exceeds said low  
watermark limit.
4. (Original) The method of claim 3 wherein said reallocating further comprises:

allocating an IP address from IP addresses reclaimed from other IP address pools  
when said high watermark exceeds said high watermark limit and when  
the number of unallocated IP addresses is insufficient;  
allocating an IP addresses from unallocated IP addresses when said high  
watermark exceeds said high watermark limit and when the number of  
unallocated IP addresses is sufficient; and  
reallocating one or more IP address pools to reclaim IP addresses from a local IP  
address pool when said high watermark is less than said high watermark  
limit and said low watermark is greater than said low watermark limit.

5. (Original) The method of claim 1 wherein  
each said local IP address pool further comprises a low watermark that indicates  
the minimum number of IP addresses used by said network edge device;  
said determining further comprises ascertaining whether said low  
watermark of said address pool exceeds a low watermark limit; and  
said method further comprises indicating one or more IP address pools should be  
reallocated to reclaim IP addresses from the network element associated  
with said low watermark when said low watermark exceeds said low  
watermark limit.

6. (Original) The method of claim 3 wherein  
said low watermark is expressed as a percentage of allocated IP addresses; and  
said high watermark is expressed as a percentage of allocated IP addresses.

7. (Original) The method of claim 6 wherein said network operates according to a simple network management protocol (SNMP).

8. (Original) The method of claim 7 wherein  
said low watermark is stored in an expression MIB; and  
said high watermark is stored in an expression MIB.

9. (Withdrawn) A method for managing Internet Protocol (IP) addresses on a data communications network, comprising:

allocating a plurality of local IP address pools, each of said local IP address pools  
associated with a different network edge device capable of accepting  
connection requests requiring an IP address, said network edge device  
having a local memory, said local memory including a local IP address  
pool database;

receiving a communication from said network edge device, said communication  
including an IP address usage summary;

determining whether one or more of said plurality of local IP address pools should  
be adjusted based upon said IP address usage summary; and

adjusting one or more of said plurality of local IP address pools based upon said  
determining.

10. (Withdrawn) The method of claim 9 wherein:

- said local IP address pool includes a high watermark that indicates the maximum number of IP addresses used by said network edge device;
- said determining further comprises ascertaining whether said high watermark of a local address pool exceeds a high watermark limit; and
- said method further comprises indicating one or more IP address pools should be reallocated to give more IP addresses to the network element associated with said high watermark when said high watermark exceeds said high watermark limit.
11. (Withdrawn) The method of claim 10 wherein
- each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device;
- said determining further comprises ascertaining whether said low watermark of a said address pool exceeds a low watermark limit; and
- said method further comprises indicating one or more IP address pools should be reallocated to reclaim IP addresses from the network element associated with said low watermark when said low watermark exceeds said low watermark limit.
12. (Withdrawn) The method of claim 11 wherein said reallocating further comprises:

- allocating an IP address from IP addresses reclaimed from other IP address pools  
when said high watermark exceeds said high watermark limit and when  
the number of unallocated IP addresses is insufficient;
- allocating an IP addresses from unallocated IP addresses when said high  
watermark exceeds said high watermark limit and when the number of  
unallocated IP addresses is sufficient; and
- reallocating one or more IP address pools to reclaim IP addresses from a local IP  
address pool when said high watermark is less than said high watermark  
limit and said low watermark is greater than said low watermark limit.
13. (Withdrawn) The method of claim 9 wherein  
each said local IP address pool further comprises a low watermark that indicates  
the minimum number of IP addresses used by said network edge device;  
said determining further comprises ascertaining whether said low watermark of  
said address pool exceeds a low watermark limit; and  
said method further comprises indicating one or more IP address pools should be  
reallocated to reclaim IP addresses from the network element associated  
with said low watermark when said low watermark exceeds said low  
watermark limit.
14. (Withdrawn) The method of claim 11 wherein  
said low watermark is expressed as a percentage of allocated IP addresses; and  
said high watermark is expressed as a percentage of allocated IP addresses.

15. (Withdrawn) The method of claim 14 wherein said network operates according to a simple network management protocol (SNMP).
16. (Withdrawn) The method of claim 15 wherein  
said low watermark is stored in an expression MIB; and  
said high watermark is stored in an expression MIB.
17. (Withdrawn) A method for managing Internet Protocol (IP) addresses on a data communications network, comprising:  
receiving a communication;  
allocating an available IP address from said local IP address pool if said  
communication includes a connection request, said local IP address pool  
associated with a different network edge device capable of accepting  
connection requests;  
determining whether said local IP address pool should be adjusted;  
sending a alarm message to an IP pool manager when said IP address pool should  
be adjusted; and  
storing an IP address allocation when said communication includes an IP address  
allocation.
18. (Withdrawn) The method of claim 17 wherein

said local IP address pool includes a high watermark that indicates the maximum number of IP addresses used by said network edge device; and

said determining further comprises:

ascertaining whether said high watermark of a local address pool exceeds a high watermark limit; and

indicating one or more IP address pools should be reallocated to give more IP addresses to said network edge device when said high watermark exceeds said high watermark limit.

19. (Withdrawn) The method of claim 18 wherein
- each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device;
- and
- said determining further comprises:
- ascertaining whether said low watermark of said address pool exceeds a low watermark limit; and
- said method further comprises indicating one or more IP address pools should be reallocated to reclaim IP addresses from said network edge device when said low watermark exceeds said low watermark limit.

20. (Withdrawn) The method of claim 19 wherein said reallocating further comprises:



allocating an IP address from IP addresses reclaimed from other IP address pools  
when said high watermark exceeds said high watermark limit and when  
the number of unallocated IP addresses is insufficient;  
allocating an IP addresses from unallocated IP addresses when said high  
watermark exceeds said high watermark limit and when the number of  
unallocated IP addresses is sufficient; and  
reallocating one or more IP address pools to reclaim IP addresses from said local  
IP address pool when said high watermark is less than said high  
watermark limit and said low watermark is greater than said low  
watermark limit.

21. (Withdrawn) The method of claim 17 wherein  
each said local IP address pool further comprises a low watermark that indicates  
the minimum number of IP addresses used by said network edge device;  
and  
said determining further comprises:  
ascertaining whether said low watermark of said local address pool  
exceeds a low watermark limit; and  
indicating one or more IP address pools should be reallocated to reclaim IP  
addresses from the network element associated with said low watermark  
when said low watermark exceeds said low watermark limit.

22. (Withdrawn) The method of claim 19 wherein

said low watermark is expressed as a percentage of allocated IP addresses; and  
said high watermark is expressed as a percentage of allocated IP addresses.

23. (Withdrawn) The method of claim 22 wherein said network operates according to a simple network management protocol (SNMP).

24. (Withdrawn) The method of claim 23 wherein  
said low watermark is stored in an expression MIB; and  
said high watermark is stored in an expression MIB.

25. (Original) A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method to manage Internet Protocol (IP) addresses on a data communications network, the method comprising:  
  
allocating a plurality of local IP address pools, each of said local IP address pools  
associated with a different network edge device capable of accepting  
connection requests requiring an IP address, said network edge device  
having a local memory, said local memory including a local IP address  
pool database;  
  
requesting IP address usage data from one or more of said network edge devices;  
receiving said requested IP address usage data;  
  
determining whether one or more of said plurality of local IP address pools should  
be reallocated based upon at least said requested IP address usage data;

- reallocating one or more of said plurality of local IP address pools based upon  
said determining; and  
updating one or more of said local IP address pool databases and a global IP pool  
database based upon said reallocating, said global IP address pool  
database including the information maintained in each said local IP  
address pool.
26. (Original) The program storage device of claim 25 wherein  
said local IP address pool includes a high watermark that indicates the maximum  
number of IP addresses used by said network edge device;  
said determining further comprises ascertaining whether said high watermark of a  
local address pool exceeds a high watermark limit; and  
said method further comprises indicating one or more IP address pools should be  
reallocated to give more IP addresses to the network element associated  
with said high watermark when said high watermark exceeds said high  
watermark limit.
27. (Original) The program storage device of claim 26 wherein  
each said local IP address pool further comprises a low watermark that indicates  
the minimum number of IP addresses used by said network edge device;  
said determining further comprises ascertaining whether said low watermark of  
said address pool exceeds a low watermark limit; and

said method further comprises indicating one or more IP address pools should be reallocated to reclaim IP addresses from the network element associated with said low watermark when said low watermark exceeds said low watermark limit.

28. (Original) The program storage device of claim 27 wherein said reallocating further comprises:

allocating an IP address from IP addresses reclaimed from other IP address pools when said high watermark exceeds said high watermark limit and when the number of unallocated IP addresses is insufficient;

allocating an IP addresses from unallocated IP addresses when said high watermark exceeds said high watermark limit and when the number of unallocated IP addresses is sufficient; and

reallocating one or more IP address pools to reclaim IP addresses from a local IP address pool when said high watermark is less than said high watermark limit and said low watermark is greater than said low watermark limit.

29. (Original) The program storage device of claim 25 wherein each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device;
- said determining further comprises ascertaining whether said low watermark of said address pool exceeds a low watermark limit; and

said method further comprises indicating one or more IP address pools should be reallocated to reclaim IP addresses from the network element associated with said low watermark when said low watermark exceeds said low watermark limit.

30. (Original) The program storage device of claim 27 wherein said low watermark is expressed as a percentage of allocated IP addresses; and said high watermark is expressed as a percentage of allocated IP addresses.
31. (Original) The program storage device of claim 30 wherein said network operates according to a simple network management protocol (SNMP).
32. (Original) The program storage device of claim 31 wherein said low watermark is stored in an expression MIB; and said high watermark is stored in an expression MIB.
33. (Withdrawn) A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method to manage Internet Protocol (IP) addresses on a data communications network, the method comprising:  
  
allocating a plurality of local IP address pools, each of said local IP address pools associated with a different network edge device capable of accepting connection requests requiring an IP address, said network edge device

having a local memory, said local memory including a local IP address pool database;

receiving a communication from said network edge device, said communication including an IP address usage summary;

determining whether one or more of said plurality of local IP address pools should be adjusted based upon said IP address usage summary; and

adjusting one or more of said plurality of local IP address pools based upon said determining.

34. (Withdrawn) The program storage device of claim 33 wherein:
- said local IP address pool includes a high watermark that indicates the maximum number of IP addresses used by said network edge device;
- said determining further comprises ascertaining whether said high watermark of a local address pool exceeds a high watermark limit; and
- said method further comprises indicating one or more IP address pools should be reallocated to give more IP addresses to the network element associated with said high watermark when said high watermark exceeds said high watermark limit.

35. (Withdrawn) The program storage device of claim 34 wherein
- each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device;

said determining further comprises ascertaining whether said low watermark of a  
said address pool exceeds a low watermark limit; and  
said method further comprises indicating one or more IP address pools should be  
reallocated to reclaim IP addresses from the network element associated  
with said low watermark when said low watermark exceeds said low  
watermark limit.

36. (Withdrawn) The program storage device of claim 35 wherein said reallocating  
further comprises:

allocating an IP address from IP addresses reclaimed from other IP address pools  
when said high watermark exceeds said high watermark limit and when  
the number of unallocated IP addresses is insufficient;  
allocating an IP addresses from unallocated IP addresses when said high  
watermark exceeds said high watermark limit and when the number of  
unallocated IP addresses is sufficient; and  
reallocating one or more IP address pools to reclaim IP addresses from a local IP  
address pool when said high watermark is less than said high watermark  
limit and said low watermark is greater than said low watermark limit.

37. (Withdrawn) The program storage device of claim 33 wherein  
each said local IP address pool further comprises a low watermark that indicates  
the minimum number of IP addresses used by said network edge device;

- said determining further comprises ascertaining whether said low watermark of  
said address pool exceeds a low watermark limit; and  
said method further comprises indicating one or more IP address pools should be  
reallocated to reclaim IP addresses from the network element associated  
with said low watermark when said low watermark exceeds said  
low watermark limit.
38. (Withdrawn) The program storage device of claim 35 wherein  
said low watermark is expressed as a percentage of allocated IP addresses; and  
said high watermark is expressed as a percentage of allocated IP addresses.
39. (Withdrawn) The program storage device of claim 38 wherein said network  
operates according to a simple network management protocol (SNMP).
40. (Withdrawn) The program storage device of claim 39 wherein  
said low watermark is stored in an expression MIB; and  
said high watermark is stored in an expression MIB.
41. (Withdrawn) A program storage device readable by a machine, embodying a  
program of instructions executable by the machine to perform a method to  
manage Internet Protocol (IP) addresses on a data communications network, the  
method comprising:  
receiving a communication;



- allocating an available IP address from said local IP address pool if said communication includes a connection request, said local IP address pool associated with a different network edge device capable of accepting connection requests;
- determining whether said local IP address pool should be adjusted;
- sending a alarm message to an IP pool manager when said IP address pool should be adjusted; and
- storing an IP address allocation when said communication includes an IP address allocation.
42. (Withdrawn) The program storage device of claim 41 wherein said local IP address pool includes a high watermark that indicates the maximum number of IP addresses used by said network edge device; and said determining further comprises:
- ascertaining whether said high watermark of a local address pool exceeds a high watermark limit; and
- indicating one or more IP address pools should be reallocated to give more IP addresses to said network edge device when said high watermark exceeds said high watermark limit.
43. (Withdrawn) The program storage device of claim 42 wherein

each said local IP address pool further comprises a low watermark that indicates  
the minimum number of IP addresses used by said network edge device;

and

said determining further comprises:

ascertaining whether said low watermark of said address pool exceeds a low  
watermark limit; and

said method further comprises indicating one or more IP address pools should be  
reallocated to reclaim IP addresses from said network edge device when  
said low watermark exceeds said low watermark limit.

44. (Withdrawn) The program storage device of claim 43 wherein said reallocating  
further comprises:

allocating an IP address from IP addresses reclaimed from other IP address pools  
when said high watermark exceeds said high watermark limit and when  
the number of unallocated IP addresses is insufficient;

allocating an IP addresses from unallocated IP addresses when said high  
watermark exceeds said high watermark limit and when the number of  
unallocated IP addresses is sufficient; and

reallocating one or more IP address pools to reclaim IP addresses from said local  
IP address pool when said high watermark is less than said high  
watermark limit and said low watermark is greater than said low  
watermark limit.

45. (Withdrawn) The program storage device of claim 41 wherein  
each said local IP address pool further comprises a low watermark that indicates  
the minimum number of IP addresses used by said network edge device;  
and  
said determining further comprises:  
ascertaining whether said low watermark of said local address pool exceeds a low  
watermark limit; and  
indicating one or more IP address pools should be reallocated to reclaim IP  
addresses from the network element associated with said low watermark  
when said low watermark exceeds said low watermark limit.
46. (Withdrawn) The program storage device of claim 43 wherein  
said low watermark is expressed as a percentage of allocated IP addresses; and  
said high watermark is expressed as a percentage of allocated IP addresses.
47. (Withdrawn) The program storage device of claim 46 wherein said network  
operates according to a simple network management protocol (SNMP).
48. (Withdrawn) The program storage device of claim 47 wherein  
said low watermark is stored in an expression MIB; and  
said high watermark is stored in an expression MIB.

49. (Original) An apparatus for managing Internet Protocol (IP) addresses on a data communications network, the apparatus comprising:
- means for allocating a plurality of local IP address pools, each of said local IP address pools associated with a different network edge device capable of accepting connection requests requiring an IP address, said network edge device having a local memory, said local memory including a local IP address pool database;
  - means for requesting IP address usage data from one or more of said network edge devices;
  - means for receiving said requested IP address usage data;
  - means for determining whether one or more of said plurality of local IP address pools should be reallocated based upon at least said requested IP address usage data;
  - means for reallocating one or more of said plurality of local IP address pools based upon said determining; and
  - means for updating one or more of said local IP address pool databases and a global IP pool database based upon said reallocating, said global IP address pool database including the information maintained in each said local IP address pool.
50. (Original) The apparatus of claim 49 wherein
- said local IP address pool includes a high watermark that indicates the maximum number of IP addresses used by said network edge device;

said means for determining further comprises means for ascertaining whether said

high watermark of a local address pool exceeds a high watermark limit;

and

said apparatus further comprises means for indicating one or more IP address

pools should be reallocated to give more IP addresses to the network

element associated with said high watermark when said high watermark

exceeds said high watermark limit.

51. (Original) The apparatus of claim 50 wherein

each said local IP address pool further comprises a low watermark that indicates

the minimum number of IP addresses used by said network edge device;

said means for determining further comprises means for ascertaining whether said

low watermark of said address pool exceeds a low watermark limit; and

said apparatus further comprises means for indicating one or more IP address

pools should be reallocated to reclaim IP addresses from the network

element associated with said low watermark when said low watermark

exceeds said low watermark limit.

52. (Original) The apparatus of claim 51 wherein said reallocating further comprises:

means for allocating an IP address from IP addresses reclaimed from other IP

address pools when said high watermark exceeds said high watermark

limit and when the number of unallocated IP addresses is insufficient;

means for allocating an IP addresses from unallocated IP addresses when said high watermark exceeds said high watermark limit and when the number of unallocated IP addresses is sufficient; and

means for reallocating one or more IP address pools to reclaim IP addresses from a local IP address pool when said high watermark is less than said high watermark limit and said low watermark is greater than said low watermark limit.

53. (Original) The apparatus of claim 49 wherein each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device; said means for determining further comprises ascertaining whether said low watermark of said address pool exceeds a low watermark limit; and said apparatus further comprises means for indicating one or more IP address pools should be reallocated to reclaim IP addresses from the network element associated with said low watermark when said low watermark exceeds said low watermark limit.

54. (Original) The apparatus of claim 51 wherein said low watermark is expressed as a percentage of allocated IP addresses; and said high watermark is expressed as a percentage of allocated IP addresses.

55. (Original) The apparatus of claim 54 wherein said network operates according to a simple network management protocol (SNMP).
56. (Original) The apparatus of claim 55 wherein said low watermark is stored in an expression MIB; and said high watermark is stored in an expression MIB.
57. (Withdrawn) An apparatus for managing Internet Protocol (IP) addresses on a data communications network, the apparatus comprising:  
means for allocating a plurality of local IP address pools, each of said local IP address pools associated with a different network edge device capable of accepting connection requests requiring an IP address, said network edge device having a local memory, said local memory including a local IP address pool database;  
means for receiving a communication from said network edge device, said communication including an IP address usage summary;  
means for determining whether one or more of said plurality of local IP address pools should be adjusted based upon said IP address usage summary; and  
means for adjusting one or more of said plurality of local IP address pools based upon said determining.
58. (Withdrawn) The apparatus of claim 57 wherein:

said local IP address pool includes a high watermark that indicates the maximum number of IP addresses used by said network edge device;  
said means for determining further comprises means for ascertaining whether said high watermark of a local address pool exceeds a high watermark limit;  
and  
said apparatus further comprises means for indicating one or more IP address pools should be reallocated to give more IP addresses to the network element associated with said high watermark when said high watermark exceeds said high watermark limit.

59. (Withdrawn) The apparatus of claim 10 wherein  
each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device;  
said means for determining further comprises means for ascertaining whether said low watermark of a said address pool exceeds a low watermark limit; and  
said apparatus further comprises means for indicating one or more IP address pools should be reallocated to reclaim IP addresses from the network element associated with said low watermark when said low watermark exceeds said low watermark limit.

60. (Withdrawn) The apparatus of claim 11 wherein said reallocating further comprises:



means for allocating an IP address from IP addresses reclaimed from other IP address pools when said high watermark exceeds said high watermark limit and when the number of unallocated IP addresses is insufficient;

means for allocating an IP addresses from unallocated IP addresses when said high watermark exceeds said high watermark limit and when the number of unallocated IP addresses is sufficient; and

means for reallocating one or more IP address pools to reclaim IP addresses from a local IP address pool when said high watermark is less than said high watermark limit and said low watermark is greater than said low watermark limit.

61. (Withdrawn) The apparatus of claim 57 wherein
- each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device;
- said means for determining further comprises means for ascertaining whether said low watermark of said address pool exceeds a low watermark limit; and
- said apparatus further comprises means for indicating one or more IP address pools should be reallocated to reclaim IP addresses from the network element associated with said low watermark when said low watermark exceeds said low watermark limit.

62. (Withdrawn) The apparatus of claim 59 wherein
- said low watermark is expressed as a percentage of allocated IP addresses; and

said high watermark is expressed as a percentage of allocated IP addresses.

63. (Withdrawn) The apparatus of claim 62 wherein said network operates according to a simple network management protocol (SNMP).
64. (Withdrawn) The apparatus of claim 63 wherein  
said low watermark is stored in an expression MIB; and  
said high watermark is stored in an expression MIB.
65. (Withdrawn) An apparatus for managing Internet Protocol (IP) addresses on a data communications network, the apparatus comprising:  
means for receiving a communication;  
means for allocating an available IP address from a local IP address pool if said  
communication includes a connection request, said local IP address pool  
associated with a different network edge device capable of accepting  
connection requests;  
means for determining whether said local IP address pool should be adjusted;  
means for sending a alarm message to a global IP pool manager when said IP  
address pool should be adjusted; and  
means for storing an IP address allocation when said communication includes an  
IP address allocation.
66. (Withdrawn) The apparatus of claim 65 wherein

said local IP address pool includes a high watermark that indicates the maximum number of IP addresses used by said network edge device; and

said means for determining further comprises:

means for ascertaining whether said high watermark of a local address pool exceeds a high watermark limit; and

means for indicating one or more IP address pools should be reallocated to give more IP addresses to said network edge device when said high watermark exceeds said high watermark limit.

67. (Withdrawn) The apparatus of claim 66 wherein

each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device; and

said means for determining further comprises:

means for ascertaining whether said low watermark of said address pool exceeds a low watermark limit; and

said apparatus further comprises means for indicating one or more IP address pools should be reallocated to reclaim IP addresses from said network edge device when said low watermark exceeds said low watermark limit.

68. (Withdrawn) The apparatus of claim 67 wherein said reallocating further comprises:

- means for allocating an IP address from IP addresses reclaimed from other IP address pools when said high watermark exceeds said high watermark limit and when the number of unallocated IP addresses is insufficient;
- means for allocating an IP addresses from unallocated IP addresses when said high watermark exceeds said high watermark limit and when the number of unallocated IP addresses is sufficient; and
- means for reallocating one or more IP address pools to reclaim IP addresses from said local IP address pool when said high watermark is less than said high watermark limit and said low watermark is greater than said low watermark limit.
69. (Withdrawn) The apparatus of claim 65 wherein
- each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device;
- and
- said means for determining further comprises:
- means for ascertaining whether said low watermark of said local address pool exceeds a low watermark limit; and
- means for indicating one or more IP address pools should be reallocated to reclaim IP addresses from the network element associated with said low watermark when said low watermark exceeds said low watermark limit.
70. (Withdrawn) The apparatus of claim 67 wherein

said low watermark is expressed as a percentage of allocated IP addresses; and  
said high watermark is expressed as a percentage of allocated IP addresses.

71. (Withdrawn) The apparatus of claim 70 wherein said network operates according to a simple network management protocol (SNMP).
72. (Withdrawn) The apparatus of claim 71 wherein  
said low watermark is stored in an expression MIB; and  
said high watermark is stored in an expression MIB.
73. (Original) An apparatus capable of managing Internet Protocol (IP) addresses on a data communications network, said apparatus comprising:  
a memory for storing a global IP address pool; and  
a global IP pool manager, comprising:  
an allocator capable of allocating a plurality of local IP address pools, each of said  
local IP address pools associated with a different network edge device  
capable of accepting connection requests requiring an IP address;  
a requestor capable of requesting IP address usage data from one or more of said  
network edge devices;  
a determiner capable of determining whether one or more of said plurality of local  
IP address pools should be reallocated based upon at least said requested  
IP address usage data;

a reallocator capable of reallocating one or more of said plurality of local IP address pools based upon said an indication from said determiner; and  
an updater capable of updating one or more of said local IP address pool databases and said global IP pool database based upon said reallocating.

74. (Original) The apparatus of claim 73 wherein  
said local IP address pool includes a high watermark that indicates the maximum number of IP addresses used by said network edge device; and  
said determiner is further configured to ascertain whether said high watermark of a local address pool exceeds a high watermark limit and to indicate IP address pool should be reallocated to give more IP addresses to the network element associated with said high watermark when said high watermark exceeds said high watermark limit.

75. (Original) The apparatus of claim 74 wherein  
each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device;  
and  
said determiner is further configured to ascertain whether said low watermark of said address pool exceeds a low watermark limit and to indicate one or more IP address pools should be reallocated to reclaim IP addresses from the network element associated with said low watermark when said low watermark exceeds said low watermark limit.

76. (Original) The apparatus of claim 75 wherein said reallocator further configured to:
- allocate an IP address from IP addresses reclaimed from other IP address pools
- when said high watermark exceeds said high watermark limit and when
- the number of unallocated IP addresses is insufficient;
- allocate an IP addresses from unallocated IP addresses when said high watermark
- exceeds said high watermark limit and when the number of unallocated IP
- addresses is sufficient; and
- reallocate one or more IP address pools to reclaim IP addresses from a local IP
- address pool when said high watermark is less than said high watermark
- limit and said low watermark is greater than said low watermark limit.
77. (Original) The apparatus of claim 73 wherein
- each said local IP address pool further comprises a low watermark that indicates
- the minimum number of IP addresses used by said network edge device;
- and
- said determiner is further configured to ascertain whether said low watermark of
- said address pool exceeds a low watermark limit and to indicate one or
- more IP address pools should be reallocated to reclaim IP addresses from
- the network element associated with said low watermark when said low
- watermark exceeds said low watermark limit.

78. (Original) The apparatus of claim 75 wherein  
said low watermark is expressed as a percentage of allocated IP addresses; and  
said high watermark is expressed as a percentage of allocated IP addresses.
79. (Original) The apparatus of claim 78 wherein said network operates  
according to a simple network management protocol (SNMP).
80. (Original) The apparatus of claim 79 wherein  
said low watermark is stored in an expression MIB; and  
said high watermark is stored in an expression MIB.
81. (Withdrawn) An apparatus capable of managing Internet Protocol (IP) addresses  
on a data communications network, said apparatus comprising:  
a memory for storing a global IP address pool; and  
a global IP pool manager, comprising:  
an allocator capable of allocating a plurality of local IP address pools, each of said  
local IP address pools associated with a different network edge device  
capable of accepting connection requests requiring an IP address;  
a receiving interface capable of receiving a communication from said network  
edge device, said communication including an IP address usage summary;  
a determiner capable of determining whether one or more of said plurality  
of local IP address pools should be reallocated based upon said IP address  
usage data;



a reallocator capable of reallocating one or more of said plurality of local IP address pools based upon said an indication from said determiner; and an updater capable of updating one or more of said local IP address pool databases and said global IP pool database based upon said reallocating.

82. (Withdrawn) The apparatus of claim 81 wherein:
- said local IP address pool includes a high watermark that indicates the maximum number of IP addresses used by said network edge device; and
- said determiner is further configured to ascertain whether said high watermark of a local address pool exceeds a high watermark limit and to indicate one or more IP address pools should be reallocated to give more IP addresses to the network element associated with said high watermark when said high watermark exceeds said high watermark limit.

83. (Withdrawn) The apparatus of claim 82 wherein
- each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device; and
- said determiner is further configured to ascertain whether said low watermark of a said address pool exceeds a low watermark limit and to indicate one or more IP address pools should be reallocated to reclaim IP addresses from the network element associated with said low watermark when said low watermark exceeds said low watermark limit.

84. (Withdrawn) The apparatus of claim 83 wherein said reallocator is further configured to:
- allocate an IP address from IP addresses reclaimed from other IP address pools
- when said high watermark exceeds said high watermark limit and when the number of unallocated IP addresses is insufficient;
- allocate an IP addresses from unallocated IP addresses when said high watermark exceeds said high watermark limit and when the number of unallocated IP addresses is sufficient; and
- reallocate one or more IP address pools to reclaim IP addresses from a local IP address pool when said high watermark is less than said high watermark limit and said low watermark is greater than said low watermark limit.
85. (Withdrawn) The apparatus of claim 81 wherein
- each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device;
- and
- said determiner is further configured to ascertain whether said low watermark of said address pool exceeds a low watermark limit and to indicate one or more IP address pools should be reallocated to reclaim IP addresses from the network element associated with said low watermark when said low watermark exceeds said low watermark limit.
86. (Withdrawn) The apparatus of claim 83 wherein

said low watermark is expressed as a percentage of allocated IP addresses; and  
said high watermark is expressed as a percentage of allocated IP addresses.

87. (Withdrawn) The apparatus of claim 86 wherein said network operates according to a simple network management protocol (SNMP).
88. (Withdrawn) The apparatus of claim 84 wherein  
said low watermark is stored in an expression MIB; and  
said high watermark is stored in an expression MIB.
89. (Withdrawn) An apparatus capable of managing Internet Protocol (IP) addresses on a data communications network, said apparatus comprising:  
a receiver capable of receiving a communication;  
an allocator capable of allocating an available IP address from a local IP address pool if said communication includes a connection request, said local IP address pool associated with a different network edge device capable of accepting connection requests;  
a determiner capable of determining whether said local IP address pool should be adjusted;  
an notifier capable of sending a alarm message to a global IP pool manager when said IP address pool should be adjusted; and  
a memory capable of storing an IP address allocation when said communication includes an IP address allocation.

90. (Withdrawn) The apparatus of claim 89 wherein  
said local IP address pool includes a high watermark that indicates the maximum  
number of IP addresses used by said network edge device; and  
said determiner is further configured to ascertain whether said high watermark of  
a local address pool exceeds a high watermark limit and to indicate one or  
more IP address pools should be reallocated to give more IP addresses to  
said network edge device when said high watermark exceeds said high  
watermark limit.
91. (Withdrawn) The apparatus of claim 90 wherein  
each said local IP address pool further comprises a low watermark that indicates  
the minimum number of IP addresses used by said network edge device;  
and  
said determiner is further configured to ascertain whether said low watermark of  
said address pool exceeds a low watermark limit and to indicate one or  
more IP address pools should be reallocated to reclaim IP addresses from  
said network edge device when said low watermark exceeds said low  
watermark limit.
92. (Withdrawn) The apparatus of claim 91 wherein said reallocator is further  
configured to:

allocate an IP address from IP addresses reclaimed from other IP address pools  
when said high watermark exceeds said high watermark limit and when  
the number of unallocated IP addresses is insufficient;  
allocate an IP addresses from unallocated IP addresses when said high watermark  
exceeds said high watermark limit and when the number of unallocated IP  
addresses is sufficient; and  
reallocate one or more IP address pools to reclaim IP addresses from said local IP  
address pool when said high watermark is less than said high watermark  
limit and said low watermark is greater than said low watermark limit.

93. (Withdrawn) The apparatus of claim 89 wherein  
each said local IP address pool further comprises a low watermark that indicates  
the minimum number of IP addresses used by said network edge device;  
and  
said determiner is further configured to ascertain whether said low watermark of  
said local address pool exceeds a low watermark limit and to indicate one  
or more IP address pools should be reallocated to reclaim IP addresses  
from the network element associated with said low watermark when said  
low watermark exceeds said low watermark limit.

94. (Withdrawn) The apparatus of claim 91 wherein  
said low watermark is expressed as a percentage of allocated IP addresses; and  
said high watermark is expressed as a percentage of allocated IP addresses.

95. (Withdrawn) The apparatus of claim 94 wherein said network operates according to a simple network management protocol (SNMP).
96. (Withdrawn) The apparatus of claim 95 wherein said low watermark is stored in an expression MIB; and said high watermark is stored in an expression MIB.